

REMARKS

Claims 44-46 have been added as supported by the Examples in the specification.

No new matter has been added.

Claims 14, 15, 16, 27, and 31-46 are active in this application.

Applicants respectfully request reconsideration of the application in view of the following remarks and the attached Rule 132 Declaration.

Applicants wish to thank Examiner Bernsteyn for the helpful discussion with Applicants' Representative on August 4, 2009. The Examiner indicated that it may be best to show that in Mueller the filtration volume per time is not increased.

The rejection of the claims 14, 15, 16, 27, and 31-43 over Mueller alone or in view of Hackh's Chemical Dictionary is traversed.

It is an object of the present invention to provide copolymers or polymers having improved effectiveness in the solvent deparaffinization of paraffinic mineral oil distillates, in particular when used in different feedstocks and using different solvent systems. In particular, the more effective dewaxing aids should be provided very substantially on the basis of existing starting materials which should cause no substantial changes in the performance of the deparaffinization technology of crude oils or crude oil products. See page 2, 1st paragraph of the specification.

Amended Claim 14 relates to a method for solvent deparaffinization of paraffinic mineral oil distillates, comprising:

adding a dewaxing additive and a solvent to said paraffinic mineral oil distillates, to obtain a solvent-paraffinic mineral oil mixture;

stirring the mixture until a clear solution results;

cooling the solution to below -20°C at a defined rate, thereby forming paraffin crystals which form a filter cake which is porous and permeable to the solution; and

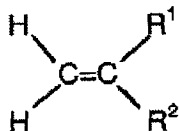
separating said paraffin crystals from said solution by filtration;

increasing a filtration volume per filtration time compared to the filtration volume per filtration time using no dewaxing additive; and

obtaining deparaffinized mineral oil distillates;

wherein said dewaxing additive comprises a copolymer of the following free-radically polymerizable monomers of Formulae A and B:

Formula A:



wherein

$\text{R}^1 = \text{H}$ or CH_3 ,

$\text{R}^2 =$ phenyl, benzyl, naphthyl, anthranyl, phenanthryl, N-pyrrolidonyl, N-imidazolyl,

2-pyridyl, 4-pyridyl or an alkyl-substituted aromatic substituent or

$\text{R}^2 = \text{COOR}^3$ where $\text{R}^3 = \text{H}$ or R^3 is a linear or branched alkyl radical of $\text{C}_1\text{-C}_{10}$

or

R^3 is a heteroatom-substituted radical $-(\text{CH}_2)_n\text{X}$ where $\text{X} = \text{OH}$ or $\text{X} = \text{N}(\text{R}^4)_2$

wherein $n = 1\text{-}10$ and R^4 is in each case independently H or $\text{R}^4 = \text{C}_1\text{-C}_4\text{-alkyl}$

or

R^3 is $-(CH_2CH_2O)_mR^5$ wherein $m = 1-90$ and $R^5 = H$ or $R^5 = C_1-C_{18}$ or R^3 is a benzyl, phenyl or cyclohexyl radical

or

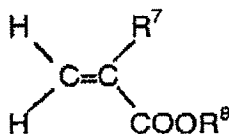
$R^2 = CONHR^6$ wherein $R^6 = H$ or R^6 is a linear or branched alkyl radical of C_1-C_{10}

or

R^6 is a heteroatom-substituted radical $-(CH_2)_nX$ where $X = OH$ or $X = N(R^4)_2$

wherein $n = 1-10$ and R^4 is in each case independently H or $R^4 = C_1-C_4$ -alkyl;

Formula B:



wherein $R^7 = H$ or CH_3 , and

R^8 radical = linear or branched alkyl radicals of $C_{12}-C_{40}$, and,
optionally further customary dewaxing additives.

Claim 15 provides that in the method according to Claim 14, the addition rate of the copolymer is 0.005-0.5%.

Claim 26 provides that the paraffin crystals grow epitaxially.

Claim 43 provides that the obtained deparaffinized mineral oil distillates show an increased degree of dewaxing compared to a method in which a styrene-free dewaxing aid is used.

The Examiner has taken the position that the filtration time per volume in Mueller meets the claim requirements. The attached Rule 132 Declaration shows that this is not the case. Thus, the claims cannot be anticipated by Mueller. In addition, Hackh's does not cure the defect of Mueller and consequently, the claims of the present invention are not obvious over Mueller in view of Hackh's Chemical Dictionary.

The data in the Rule 132 Declaration show that the filtration volume per time is superior in the present invention compared to Mueller et al (US 5,098,550).

In a first experiment, a 500 SN raffinate from an Italian refinery was used for the filtration together with the copolymer of behenyl acrylate and styrene designated as P1 in example 1 of the present application (see page 29, line 27 to page 30, line 8 of the specification). P1 contained 90w.-% behenyl acrylate and 10w.-% styrene; the polymer content of example 1 was 85 wt.-%.

In a second experiment, the same 500 SN raffinate was used together with the respective quantity of a 1:1-blend of polymers P1 and P2 of US 5,098,550.

P1 of US 5,098,550 was 100% poly behenyl acrylate; P2 was poly alkyl methacrylate with an average C-number within the alkyl-groups of 14; the degree of branching is 17.9%; the methacrylate was derived from a mixture of the alcohols Dobanol 25 of Shell AG and a C₁₂-C₁₈ fatty alcohol; the polymer content of the 1:1-blend of P1 and P2 was 30 wt.-%.

The filtration time with the copolymer of behenyl acrylate and styrene (P1) of example 1 of the present application as dewaxing aid is one third faster compared to a 1:1-blend of polymers P1 and P2 of US 5,098,550.

It took 240 sec to filter 65 ml using polymer (P1) of the present case and 360 sec to filter 66 ml using a 1:1-blend of polymers P1 and P2 of US 5,098,550.

There is a significant advantage for the refineries when using the dewaxing aid of the present invention and is unexpected based on the disclosure of US 5,098,550. A one third faster filtration time when using the dewaxing aid of the present invention was not foreseeable based on US 5,098,550.

Thus, based on Mueller, alone or in combination with Hackh's, one of ordinary skill in the art would not know that the filtration volume per filtration time could be significantly increased using the dewaxing aid of the present invention.

Further, the Examples in the specification clearly show that the filtration volume per time is increased compared to the filtration volume per filtration time using no dewaxing additive. Examples 9-12 from the specification are reproduced below. The comparative Example C1 is a polybehenyl acrylate. Additives with a P identifier are as follows:

copolymer of behenyl acrylate and styrene **P1**
copolymer of behenyl acrylate and benzyl methacrylate **P2**
copolymer of behenyl acrylate and n-butyl methacrylate **P4**
copolymer of behenyl acrylate and isononyl methacrylate **P5**
poly(C₁₆₋₁₈-alkyl methacrylate) **P6**
poly(C₁₂₋₁₈-alkyl methacrylate) **P7**
poly(C₁₂₋₁₈-alkyl methacrylate) **P8**.

Example 9

Filtration volumes in ml from a deparaffinization study using a 600N feedstock of a European refinery using novel styrenic copolymers

Solvent system: n-heptane

Feedstock: solvent ratio = 1:2

Procedure: 1) mixing at 70°C, 2) 30 min in a bath at 25°C, 3) 60 min in a bath at -30°C

Filtration temperature: -30°C

Filtration time [s]	No additive	P6 (800 ppm) +	P6 (800 ppm) +	P7 (1370 ppm) +	P7 (1370 ppm) +	P8 (1230 ppm) +	P8 (1230 ppm) +
		P1 (300 ppm)	C1 (300 ppm)	P1 (200 ppm)	C1 (200 ppm)	P1 (200 ppm)	C1 (200 ppm)
0	0	0	0	0	0	0	0
10	1	7	3	9	6	5	2
20	2	9		14	8	9	3
30	2	10	8	17	11	10	4
40	3	11	9	19	13	12	5
50	3.5	12	9	21	14	13.5	6
60	4	13	9.5	23	15	14.5	7
70	5	14	10	24.5	17	15.5	8
80	5.5	15	10.5	26	18	16.5	9
90	6.5	16	11	27.5	19	17.5	9.5
100	7	16.5	11	28	20	18	10
120	8	18	12	30.5	22	20	10
140	8.5	19.5	12.5	33	23.5	21	11
160	9.5	21	13	36	25	22.5	11
180	10	22	14	37.5	27	23.5	12
200	10	23.5	15	39.5	28	25	12.5
240	11	25	16	42.5	30	27	13
300	12	28.5	18	47.5	34	30	15
600	16	39	24.5	69.5	47	41	20

Example 10

Filtration volumes in ml from a deparaffinization study using a 500N feedstock of a Thai refinery

Solvent system: n-heptane

Feedstock: solvent ratio = 1:2

Procedure: 1) mixing at 70°C, 2) 30 min in a bath at 25°C, 3) 90 min in a bath at -30°C

Filtration temperature: -30°C

Filtration time [s]	No additive	P6 (800 ppm) + P1 (300 ppm)	P7 (1370 ppm) + P1 (200 ppm)	P6 (800 ppm) + C1 (300 ppm)
0	0	0	0	0
100	8.5	18	19	16
200	11	24.5	27	22
300	12.5	30	32	26.5
420	14	35	38	31
480	15	38	40	33
600	16.5	42	45	37
720	17.5	46	49	40
840	18.5	50	53	42.5
900	19.5	52.5	55	44

Example 11

Filtration volumes in ml from a deparaffinization study using a 300N feedstock from a refinery in South America

Solvent system: 55% of methyl ethyl ketone/45% of toluene

Feedstock: solvent ratio = 1:3

Procedure: 1) mixing at 70°C, 2) 30 min in a bath at 25°C, 3) 60 min in a bath at -18°C

Filtration temperature: -18°C

Filtration time [s]	No additive	P6 (800 ppm) + P1 (150 ppm)	P6 (800 ppm) + C1 (400 ppm)
0	0	0	0
50	17	38	31

100	24	55	45
150	29	68	56

Example 12

Filtration volumes in ml from a deparaffinization study using a 600N feedstock from a European refinery with novel copolymers

Solvent system: n-heptane

Feedstock: solvent ratio = 1:2

Procedure: 1) mixing at 70°C, 2) 30 min in a bath at 25°C, 3) 60 min in a bath at -30°C

Filtration temperature: -30°C

Filtration time [s]	No additive	C1 (300 ppm)	P1 (300 ppm)	P2 (300 ppm)	P4 (300 ppm)	P5 (300 ppm)
0	0	0	0	0	0	0
10	1	1	3	1	3.5	2
20	2	1	4.5	2	4.5	3.5
30	2	1.5	5.5	2.5	5.5	5
40	3	2	6.5	3.5	6.5	6
50	3.5	2.5	8	4.5	7.5	7
60	4	3	9	6	8.5	8
70	5	3.5	9	7	9.5	8.5
80	5.5	4	10	8	10	9
90	6.5	4.5	10.5	8.5	10	9.5
100	7	5	11	8.5	10	9.5
120	8	5.5	12	9.5	11	10
140	8.5	6	13	10	11.5	10
160	9.5	6.5	14	10	12	11
180	10	7	14.5	10.5	13	11.5
200	10	7.5	15	11	14	12
240	11	8	17	12	15	13
300	12	9	18.5	13	16.5	14
600	16	12	26	18	23	19.5

The Examples in the specification clearly show that the filtration volume per time is increased compared to the filtration volume per filtration time using no dewaxing additive. The superior properties of the present invention are not disclosed or suggested by Mueller, alone or in combination with Hackh's.

Further, the Examiner has taken the position that:

In light of this teaching, it seems reasonable to presume that the crystals of the reference are capable of forming a filter cake which is porous and permeable to the solution because the reference applies the same dewaxing agent and temperature conditions to the same starting material as the invention does and produces solutions that are filterable.

The Examiner's attention is drawn to MPEP 2112, IV. The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the

teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

Accordingly, the Examiner has not shown that formation of a porous and permeable filter cake necessarily flows from and is inherent in the Mueller reference.

Mueller discloses a method of dewaxing a wax-containing petroleum products with at least one solvent suitable for dewaxing and a polymeric dewaxing aid. (see the abstract).

Mueller relates to a method for dewaxing waxy petroleum products. The **dewaxing aid will be removed together with the wax. The dewaxed oil is then more or less free of dewaxing aid.**

Mueller does not disclose or suggest a method, as claimed in Claim 14, in which the dewaxing additive and a solvent are added to the paraffinic mineral oil distillates, to obtain a solvent-paraffinic mineral oil mixture;

stirring the mixture until a clear solution results;

cooling the solution to below -20°C at a defined rate, thereby forming paraffin crystals which form a filter cake which is porous and permeable to the solution; and

separating said paraffin crystals from said solution by filtration;

increasing a filtration volume per filtration time compared to the filtration volume per filtration time using no dewaxing additive; and

obtaining deparaffinized mineral oil distillates.

In addition, there is no disclosure or suggestion in Mueller, alone or in combination with Hackh's, of the addition rate of the copolymer of 0.005-0.5%, as claimed in **Claim 15**.

In addition, there is no disclosure or suggestion in Schauber and Mueller, alone or in combination, that the paraffin crystals grow epitaxially, as claimed in **Claim 26**.

Further, there is no disclosure or suggestion in Mueller, alone or in combination with Hackh's, that the obtained deparaffinized mineral oil distillates show an increased degree of dewaxing compared to a method in which a styrene-free dewaxing aid is used, as claimed in **Claim 43**.

Further, the subject matter of Claims 44-46 is not disclosed or suggested in Mueller, alone or in combination with Hackh's.

Therefore, the rejection of claims 14, 15, 16, 27, and 31-43 over Mueller alone or in view of Hackh's Chemical Dictionary is believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of this rejection is respectfully requested.

Application No.: 10/505,370
Reply to Office Action of: June 16, 2009

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

A handwritten signature in black ink, appearing to read "Kirsten Grueneberg", with a long, sweeping horizontal stroke extending to the right.

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